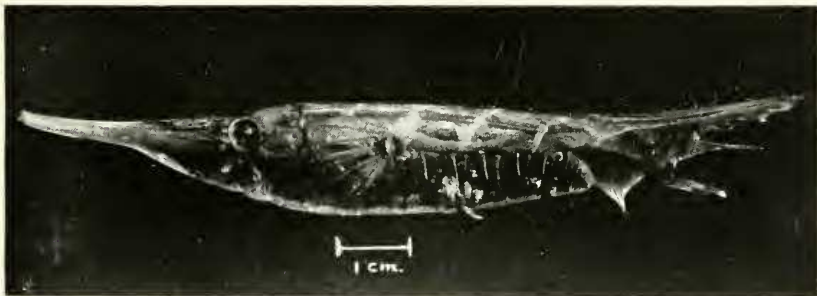


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1. *Chelon crenilabis* (Forskål).
2. *Centriscus scutatus* Linnæus.
3. *Centriscus capito* Oshima, sp. nov.

VII. A REVIEW OF THE FISHES OF THE FAMILY CENTRISCIDÆ FOUND IN THE WATERS OF FORMOSA.

BY MASAMITSU ÔSHIMA, PH.D.

(PL. XIII, FIGS. 2-3.)

The present paper gives a review of the fishes of the family *Centriscidæ* found in the waters of the Island of Formosa. It is based on the material in the Institute of Science of the Government of Formosa, collected by Mr. Muneshige Watanabe of the Marine Experiment Station at Tainan, and Mr. Akitaro Kihara of the Tôkô Fish Market. I express my hearty thanks for the courtesy shown by those two gentlemen.

Family CENTRISCIDÆ.

(THE SHRIMP FISHES.)

Form of body elongate, much compressed. Anterior bones of skull much produced and forming a long tube terminating in a small mouth. Body covered with a bony dorsal cuirass, which is connate with the internal skeleton, ending posteriorly in a long projection, which has sometimes a movable spine at its end. Longitudinal axis of the tail deflected from that of the trunk through the encroachment of the dorsal cuirass. Dorsal fins two, crowded together under the terminal spine of dorsal cuirass. Ventrals abdominal. Teeth none. Parietals absent. Post-temporal suturally connected to cranium; supraclavicle present. Ribs developed. Postclavicles present.

Habitat: Indian Ocean to Western Pacific.

Species few and small, fantastically formed, the translucent carapace suggesting that of a shrimp (Jordan & Starks).

I. CENTRISCUS Linnæus.

1758. *Centriscus* LINNÆUS, Syst. Nat., Ed. X, Vol. I, p. 336. (Type *Centriscus scutatus* LINNÆUS.)
1775. *Amphisilen* KLEIN, Neu. Schauplatz Nat. I, p. 280. (Type *Centriscus scutatus* LINNÆUS) (non-binomial).
1817. *Amphisile* (KLEIN) CUVIER, Règne Anim., Ed. I. (Type *Centriscus scutatus* LINNÆUS.)

Body elongate, strongly compressed, provided with a dorsal cuirass which is formed by portions of the skeleton; the longitudinal axis of the tail is not in the plane with that of the trunk. Scales none. Two dorsal fins, situated on the hindmost part of the back; ventral fins rudimentary, abdominal. Three or four branchiostegals; gill-opening of moderate width, four gills and pseudobranchiæ; air-bladder large; pyloric appendage none.

Distribution: From the eastern coast of Africa to the seas of China.

KEY TO SPECIES FOUND IN FORMOSA.

a¹. Length of head three or more than three in the total length; ventrals with three rays inserted midway between the anterior border of orbit and the last anal ray; the distance between the pectoral and the tip of snout equal to that between the former and the root of the first dorsal spine.

scutatus, 1.

a². Length of head less than three in the total length; ventrals with four rays inserted behind the midway between the anterior border of orbit and last anal ray; the distance between the pectoral and the tip of snout much longer than that between the former and the root of the first dorsal spine.

capito, 2.

1. *Centriscus scutatus* Linnæus. (Plate XIII, fig. 2.)

Yoroi-uwo (Japan) (Armour-fish).

1758. *Centriscus scutatus* LINNÆUS, Syst. Nat., Ed. X, p. 415.—GMELIN, Car. Linn. Syst. Nat., 1778, p. 1460.—BLOCH, Naturg. ausl. Fisch., 1786, IV, p. 80, Pl. 123, fig. 2; India.—LACÉPÈDE, Hist. Nat. Poiss., II, 1798, p. 88, i, Pl. XIX, fig. 2.—BLOCH & SCHNEIDER, Syst. Ichth., 1801, p. 113.—SHAW, Gen. Zool., V, 1800, p. 458, pl. 181.—BLEEKER, Versl. Akad. Amst. (2) II, 1868, p. 298; Waigiou.—Fish. Madagascar, 1875, p. 75; Madagascar.—JORDAN & SEALE, Bull. Bur. Fish., XXVI, 1906, p. 9; Manila.—WEBER, Fisch. Siboga Exped., 1913, p. 99; Lombok; Banda; Timor.

1763. *Centriscus* sp. GRONOVIVS, Zoophyl., No. 396, tab. 7, fig. 3.

1817. *Amphisile scutata* CUVIER, Règne Anim., Guér. Iconogr. Poiss., pl. 45, fig. 3.—BLEEKER, Journ. Ind. Arch. II, 1848, No. 9, p. 633; Sumbawa.—JERDON, Mad. Journ. Linn. Sc., XVII, 1851, p. 140; Madras.—BLEEKER, Nat. Tijdschr. Ned. Ind., II, 1851, p. 245; Banda.—*l. c.* III, 1852, p. 235; Amboina; Ceram.—*l. c.* XII, 1856, p. 216; Nias.—*l. c.* XII, 1856, p. 234; Batae Is.—*l. c.* XIII, 1857, p. 372; Sangi Is.—*l. c.* XV, 1858, p. 202; Goram Arch.—*l. c.* XVIII, 1859, p. 373; Banka.—Act. Soc. Sc. Indo-Neerl., VIII, 1860, p. 63.—GÜNTHER, Cat. Fish., III, 1861, p. 525; East Indian and Chinese Seas.—BLEEKER, Act. Soc. Ind. Neerl., VIII, 1860, p. 15; Celebes.—Versl. Akad. Amst., XII, 1861, p. 41; Singapore.—*l. c.* XIV, 1862, p. 103;

Batan.—Ned. Tijdschr. Dierk., I, 1863, p. 154; Haemahera.—*l. c.* I, 1863, p. 275; Timor.—*l. c.* IV, 1873, p. 133; China.—LÜTKEN, Vid. Medd. Nath. Fören, Kjöb., 1865, p. 213.—KLUNZIGER, Verh. z. b. Ges. Wien. 1871, p. 517.—DAY, Fish. India, 1878, p. 361; Seas of India to China.—GÜNTHER, Rept. Shore Fish., 1880, p. 53; Philippines.

Head 3. in the total length; depth 7.63; width of head 9.80 in its length; interorbital space II. in head; eye II.; 1.60 in postorbital part; D. III, 10; A. 12; P. 10; V. 3.

Body very much compressed, rather elongate, thin and more or less rounded above; tapering below to an extremely thin drawn-out cutting edge; head tapering anteriorly into a long tubular snout, ending in a terminal mouth; dermal skeleton ends posteriorly in a long, sharply pointed spine; interorbital space rather flat, with a shallow median groove, both sides of which longitudinally striated; the rostral tube compressed into a cutting edge inferiorly; mouth extremely small, terminal, with no teeth; nostrils lateral, very close together, situated one before the other in front of the orbit; operculum ovate, longer than high, antero-inferior edge sharply pointed downward; suboperculum broad anteriorly, tapering behind; præ- and interoperculum united, thin and transparent, forming a broad membraneous margin below the throat; eye moderate, situated at the posterior one-fourth of the head.

The back of the trunk cuirassed by a bony sheath, which extends downward nearly to the middle of the sides, having a shallow notch before and above the pectoral; the cuirass produced posteriorly into a sharply pointed spine; it consists of four median pairs of narrow bones and six lateral ones of lamelliform shape, and of a single, long dagger-shaped bone which forms the dorsal spine, the sutures of all these bones deeply serrated except the dorsal median suture; lower half of the sides covered by a transparent tough covering, supported by ten ribs.

Close beneath the posterior spine the vertical fins are crowded; the spinous and soft dorsals point nearly straight backward, the caudal obliquely downward, and the anal straight downward; the pectoral inserted upon the middle of the sides above, the distance from the operculum equal to the length from the pre-orbital edge to the end of operculum, the distance between origin of pectoral and the tip of snouts equals the distance between the former and the root of the

first dorsal spine, uppermost ray the longest; ventrals rudimentary, inserted upon the carinated edge of abdomen, below the fifth rib, its distance from the anterior orbital rims equal to that to the root of the last anal ray; dorsal spines slender, inserted close together, connected with the dorsal spine and with one another by a transparent membrane, the uppermost spine much longer than the others; soft dorsal ray slender and long, reaching beyond the end of the caudal; caudal fin rather tiny, obtusely rounded.

Color in alcohol uniformly pale yellow, with no markings; the rostral tube, the place occupied by the air-bladder, and the broad membraneous edge of the lower parts transparent; terminal spine and all the fins whitish.

Total length 147 mm.

Described from a single specimen from Anpin near Tainan, collected by M. Watanabe in the year 1919.

Habitat: East Indies, north to Formosa.

2. *Centriscus capito* Ôshima, sp. nov. (Plate XIII, fig. 3.)

Taiwan Yoro-i-wo (Japan) (Formosan armour-fish).

Head 2.72 in the total length; depth 6.81; width of head 9.75 in its length; interorbital space 10.75; eye 10.75; 1.5 in postorbital part; D. III, 10; A. 12; P. 10; V. 4.

Body very much compressed, elongate, thin, and very slightly rounded above, tapering below to an extremely thin, drawn-out cutting edge; head tapering into a long tubular snout, having a small terminal mouth; dermal skeleton ends posteriorly in a sharply pointed, long spine; interorbital space rather flat, with a shallow median groove, both sides of which longitudinally striated; rostral tube compressed into a cutting edge inferiorly; mouth terminal, a single pore, with no teeth; nostrils lateral, close together, situated in front of the orbit; eye moderate, posterior; operculum ovate, slightly longer than high, antero-inferior edge acutely pointed downwards; suboperculum broad anteriorly, curved and tapering posteriorly; præ- and interoperculum united, thin and transparent, forming a broad membranous margin below the throat.

The back of the trunk cuirassed by a bony sheath, which extends downwards nearly to the middle of the sides, having a shallow notch before and above the pectoral; the posterior end of the cuirass pro-

duced into a strong spine; the cuirass consists of four median pairs of narrow bone and six lateral ones of the lamelliform shape, and of a single, long, dagger-shaped bone, forming the dorsal spine; sutures of all these bones deeply serrated except the dorsal median sutures; lower parts of the sides covered with a transparent tough covering, supported by nine ribs.

Close beneath the posterior spine the vertical fins are crowded; the spinous and soft dorsal point nearly straight backward, the caudal obliquely downward, and the anal straight downward; the pectoral inserted upon the middle of the sides above, the distance from the operculum equals the length of the orbit and the operculum taken together, the distance between the pectoral and the tip of the snout much exceeds the distance between the former and the root of the first dorsal spine, the fin rather long, the uppermost ray the longest; ventrals rudimentary, inserted upon the carinated edge of abdomen, below the fourth rib, its distance from the anterior orbital margin nearly equals the distance between the ventral and the soft dorsal base; dorsal spines rather slender, inserted close together beneath the base of the dorsal spine, connected with it and with one another by a transparent membrane, the first spine the longest, nearly twice as long as the third; soft dorsal rather slender, elongate, reaching beyond the tip of caudal; caudal fin quadrate, its tip obtusely rounded.

Color in alcohol pale yellow; rostral tube, the place occupied by the air-bladder, and the membranous margin of the lower parts transparent; all the fins whitish.

Total length 108 mm.

Type: Described from a specimen from Tōkō, collected by A. Kihara, and now in the Carnegie Museum, Cat. of Fishes, No. 8287, marked "type specimen."

Habitat: Tōkō, a small town at the estuary of the Shimo-Tamusui River (three specimens).

The present species distinctly differs from *Centriscus scutatus* in the following points:

1. Head is longer, contained less than three in the total length.
2. Pectoral inserted much behind a point midway between the tip of snout and the root of the first dorsal spine.
3. Ventral is provided with four rays.
4. The distance between the ventral and the pre-orbital edge much longer than that between the former and the root of the last anal ray.